



Comparison of the Effectiveness of Maitland Spinal Mobilization Versus Mckenzie Exercise Combined with Core Stability Exercise on Pain, Range of Motion and Functional Activities in Mechanical Low Back Pain

Manikandan M¹, Parthiban S², Ashraf Y³

¹MPT Orthopedics, Assistant Professor, Swamy Vivekananda Physiotherapy College Namakkal, Tamilnadu, India; ²MPT Orthopaedics, Senior Physiotherapist, St. Martha's Hospital Bangalore, Karnataka, India; ³MPT Orthopaedics, Vice-Principal, PSG College of Physiotherapy Coimbatore, Tamilnadu, India.

ABSTRACT

Introduction: Mechanical low back pain (LBP) is low back pain associated with the spine, intervertebral disks, or surrounding soft tissues. It generally results from an acute traumatic event but may also be caused by cumulative trauma. The severity of an acute traumatic event varies widely, from twisting ones back to being involved in a motor vehicle collision. Mechanical LBP due to cumulative trauma tends to occur more commonly in the workplace.

Aim/Objectives: To find out the effects of Maitland Spinal Mobilization versus McKenzie Exercise combined with core stability exercise on pain, range of motion and functional activities in subjects with Mechanical Low Back Pain.

Methods: Among 40 patients, 12 were excluded. The remaining 28 patient's age group of 20 to 45 years were recruited. The study was a quasi-experimental comparative design. This was conducted at Department of Orthopaedics & department of physical medicine rehabilitation, PSG Hospitals, Coimbatore. By simple random sampling method, 14 patients were selected in each group of intervention. Group A received Maitland Spinal Mobilization & Group B McKenzie Exercises. The core stability exercises were a common treatment for both groups. The treatment given for groups were 3 session/week for 2 weeks. The treatment outcome was assessed using Numerical Pain Rating Scale, Range of Motion and Oswestry Disability Index. Data were analyzed by SPSS 20 to determine the effects of both the treatment regimens and compared with each other.

Results: Data analysis revealed that within group statistically significant difference within group Maitland Spinal Mobilization with Core stability exercises and McKenzie exercise with Core stability exercises both groups showed significant ($p < 0.001$) improvement for all parameters. However, the between group analysis, it showed insignificant changes ($p > 0.05$) for all parameters.

Conclusion: This study shows that Maitland Spinal Mobilization combined with Core stability exercises improves functional activities largely than McKenzie exercises combined with Core stability exercises in the treatment of patients with mechanical low back pain.

Keywords: Mechanical Low Back Pain, Maitland Mobilization, McKenzie, Core Stability Exercise, Numerical Pain Rating Scale, ODI. Range of motion

INTRODUCTION

Mechanical low back pain (LBP) is a prevalent condition characterized by discomfort originating from the spine, intervertebral discs, or surrounding soft tissues. It is typically non-specific, meaning it lacks a clear, identifiable cause. This type of pain often results from factors such as muscle strain, ligament sprain, or degenerative changes in the spine. Epidemiology and Impact: LBP is a leading cause of dis-

ability. In India, its prevalence is notably high, with studies indicating that a significant portion of the population experiences LBP at some point in their lives. The condition not only affects physical health but also has substantial economic implications due to lost workdays and healthcare costs. The pathophysiology of mechanical LBP involves complex interactions between the musculoskeletal and nervous systems. Factors such as muscle imbalances, poor posture, and spinal misalignments can contribute to the development

Corresponding Author:

Parthiban S, MPT (ORTHO), Senior physiotherapist, St. Martha's Hospital - Bangalore, Karnataka, India.
Phone: +91 8148826059; Email: parthibandeeban@gmail.com

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and persistence of pain. Understanding these mechanisms is crucial for effective management and treatment.¹ Evidence-based approaches to managing mechanical LBP emphasize a multimodal treatment plan. Physical Therapy: Interventions like the McKenzie Method (Mechanical Diagnosis and Therapy) have shown effectiveness in reducing pain and disability.² Exercise- Regular physical activity, including strengthening and stretching exercises, is beneficial. A study published in JAMA Network Open found that walking at least 78 minutes daily could reduce the risk of chronic LBP by up to 23%. Psychosocial Interventions: Addressing psychological factors such as stress and depression is vital. Cognitive-behavioral therapy (CBT) has been shown to reduce pain intensity and improve function. Prevention and Prognosis: Preventive measures include ergonomic adjustments, regular physical activity, and education on proper body mechanics. While many cases of mechanical LBP improve within a few weeks, recurrence is common. Approximately 62% of individuals experience a recurrence within a year, highlighting the importance of ongoing management strategies.¹ Mechanical low back pain is a multifaceted condition requiring a comprehensive, individualized approach to treatment. Evidence supports the use of physical therapy, exercise, pharmacological interventions, and psychosocial support in managing the condition. Continued research is essential to further refine treatment strategies and improve patient outcome. Maitland spinal mobilization is a manual therapy technique used to treat low back pain by addressing. The people are affected in socially and economically in day-to-day activities. Joint restrictions and improving movement. Studies suggest it can be effective in reducing pain improving functional in individuals with both acute & chronic MLBP.⁴

Therefore, the Maitland spinal mobilization technique exercise and McKenzie exercise with core stability exercise are effective on reducing pain-improving range of motion and functional activities in subjects with mechanical low back pain.⁴

MATERIAL AND METHODOLOGY

The study design was a Prospective, open labelled, quasi-experimental comparative design. Study Setting Department of Orthopedics & Department of Physical Medicine and Rehabilitation, PSG Hospitals, Coimbatore. Simple random sampling method. The study approval from the PSG institutional of medical science and research- Institutional Human ethical committee (IHEC), reference project No: 17/125 date approved 06.07.2017. Study Duration the period of study was 1 year 3 months. Study Materials Goniometer (universal), Inch tape, Knee hammer, hot pack, Treatment couch, Bed sheet, Pillows, Assessment chart, Pen, Timer. Treatment Duration 2 Sets 10 Repetitions, 3 session/

week for 2 weeks. Outcomes Measures- Lumbar Range of motion (Schober test), Numerical pain rating scale (NPRS), Oswestry Disability Index (ODI). Total Participants 40 subjects with mechanical low back pain were recruited. 12 Subjects were excluded according to Exclusion criteria: Lumbar spondylosis, Spinal canal stenosis, Ankylosing spondylitis, Spondylolisthesis, Spinal fracture, Spinal tumors, Infective spinal condition, Pregnancy, Who had the same treatment technique priorly. 28 Subjects were included within 20-45 years, Both male and female, Straight leg raising test- Negative, Slump test - Negative, Centralized pain, Who will consent to participate in the study. Open labelled method according to were randomly allocated into two groups by simple random sampling method. Group A: 14 Subjects Received after that Pre assessment taken followed by Maitland Spinal Mobilization Technique combined (figure:1) with Core Stability Exercises (figure:3) for 2 Sets 10 Repetitions, 3 session/ week for 2 weeks, End of the treatment Post assessment taken.

GROUP B: 14 Subjects – Received after that Pre assessment taken followed by McKenzie Exercise (figure:2) combined with Core Stability Exercises (figure:3) for two Sets 10 Repetitions, 3 session/ week for 2 weeks. End of the treatment Post assessment taken.

RESULTS

The Mean, Standard deviation and Paired-t test, Independent-t test values were used to find out any significant difference between the two groups. (Group A and B). Data collected from Group A (Maitland Spinal Mobilization) and Group B (McKenzie exercise) were analyzed by using paired t-test to measure the changes between the pre and post-test values within the group and independent –t test was done to measure the changes between group analysis. All these statistical analysis were performed through SPSS-20 Version.

WITHIN GROUP ANALYSIS

The Group A Maitland Spinal Mobilization for the Pain t value is 20.696 $p > 0.05$ non-significant results. Range of Motion-lumbar flexion the t value is 16.125 $p < 0.001$ (Table: 1 & Graph: 1) Range of Motion-lumbar extension the t value 11.449 & $p < 0.001$, (Table: 1 & Graph: 1). For ODI t value is 12.664 ($p < 0.001$) (Table: 1 & Graph: 1). The result shows that Maitland Spinal Mobilization is an effective technique on reducing pain, improving ROM and functional activities among mechanical low back pain patients.

The Group B McKenzie exercise for the Pain t values is 13.082 & $p < 0.001$. Range of Motion- lumbar flexion t value is 11.524 & $p < 0.001$, (Table: 2 & Graph: 1). Range of Motion- lumbar

extension t value is 13.682 & $p < 0.001$, (Table: 2 & Graph: 1). For ODI t values is 16.426 and $p < 0.001$ (Table: 2 & Graph: 1). The result shows that McKenzie exercise is an effective technique on reducing pain, improving ROM and functional activities among mechanical low back pain patients.

Group A & B Pain Post-test mean value 2.5 and 2.714 the t value is 0.883 ($p > 0.001$) Group A and B Range of motion lumbar flexion post-test mean value 5.428 & 5.285, the t values is 0.883 ($p > 0.001$) Group A and B Range of motion lumbar extension post-test mean value 3 and 3.428 the t test values is 0.002 ($p > 0.001$). Group A & B ODI Post-test mean value 17.142 & 15.571, the t value is 0.855 ($p > 0.001$) (Table: 3) The pre and post test results of Group A and Group B shows that there is a statistical and clinical significant effect of each therapy on reducing pain, improving ROM, and functional activities among mechanical low back pain patients.

DISCUSSION

Rafiqahmed 2014 had done study on physical therapy treatment of mechanical low back pain. They concluded that a study analysis of the results of the study show more improvement in pain and functional activity. While treated by specific lumbar mobilization and core stability exercise as compared to those patients who will be treated by specific lumbar mobilization techniques. In my quasi-experimental study among 40 subjects, 12 was excluded the remaining 28 subjects were aged 20-45 years. It was a simple random sampling method of study design. Two groups were selected with each 14 subjects.

Abhijit Dutta 2015 in his study concluded that core stabilization exercise possessed a greater potential over the effective McKenzie exercise in reducing pain and increasing the endurance level in the treatment of patients with mechanical low back pain. This is because spinal stabilization was more effective for low back patients and in further analysis the before treatment mean score of Revised ODI for core stabilization exercise was reduced, at the end of second week of treatment and which got further decreased in the end of the fourth week when compared to Group II as their baseline mean score of Revised ODI was decreased, at the end of second week of treatment and it further decreased in the end of the treatment.

The study concludes that Group A Maitland Spinal Mobilization and Group B McKenzie Exercise show significant changes in Pain, Range of Motion of lumbar flexion, extension and Functional Activities. But when both groups were compared, Group A Maitland Spinal Mobilization and Group B (McKenzie Exercise) proved to be effective in bringing changes in Range of Motion of lumbar extension and also ineffective in bringing changes in Range of Motion of lumbar

flexion and Functional Activities but there were changes in the ODI which has been statistically improved in group A comparing group B.

CONCLUSION

Maitland Spinal Mobilization Group A & McKenzie exercise Group B are both effective in the treatment of Mechanical Low Back Pain (MLBP). These techniques demonstrated clinical and statistical significance across key parameters. This study aimed to compare the effectiveness of Maitland spinal mobilization technique & McKenzie exercise in the treatment of patient with mechanical low back pain (MLBP).

The result indicate a reduction in pain levels in both groups, along with improvement in the range of motion- specifically lumbar flexion & extension. Functional activities also improved in both groups. Clinically, both groups A & B showed significant improvement in patient's complaints.

However, statistical analysis revealed no significant difference between the two groups. This suggests that Maitland Spinal Mobilization & McKenzie exercise both treatments are equally effective in improving outcomes for patient with mechanical low back pain.

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Author's Contribution:

Mr. Manikandan M -provided concept / idea / research design / writing and consultation

Mr. Parthiban. S provided data collection, analysis & journals ideas

Mrs. Ashraf. Y. provided project methodology ideas and & correction of this study & academy guide.

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Table 1: Maitland Spinal Mobilization Technique Pre & Post Values of Outcomes Group A

Outcome	Analysis	Mean	Mean difference	Standard deviation	t value	p value	Results
PAIN	PRE	7.571	2.85	0.916	20.696	0.001	Significant
	POST	2.5					
LUMBAR FLEXION ROM	PRE	2.51	2.857	0.662	16.125	0.001	Significant
	POST	5.428					
LUMBAR EXTENSION ROM	PRE	1.428	1.571	0.513	11.449	0.001	Significant
	POST	3.0					
Oswestry Disability Index	PRE	44.428	27.285	8.061	12.664	0.001	Significant
	POST	17.142					

Table 2: Mckenzie Exercise Pre & Post Values of Outcomes Group B

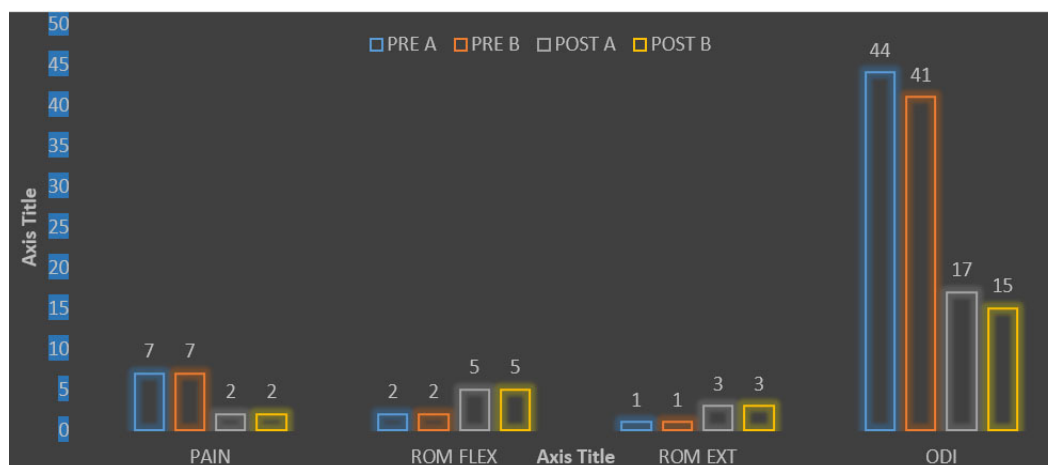
Outcome	Analysis	Mean	Mean difference	Standard deviation	t value	p value	Results
PAIN	PRE	7.50	4.785	1.368	13.082	0.001	Significant
	POST	2.714					
LUMBAR FLEXION ROM	PRE	2.214	3.071	0.997	11.524	0.001	Significant
	POST	5.285					
LUMBAR EXTENSION ROM	PRE	1.714	1.714	0.468	13.682	0.001	Significant
	POST	3.428					
Oswestry Disability Index (ODI)	PRE	41.572	26.00	5.922	16.426	0.001	Significant
	POST	15.571					

Table 3: Comparison (A & B) Results

Outcome	Analysis	Mean	t value	p value	Results
PAIN	PRE A	7.571	0.186	0.854	Not Significant
	PRE B	7.50			
	POST A	2.5	0.822	0.420	
	POST B	2.714			

Table 3: (Continued)

Outcome	Analysis	Mean	t value	p value	Results
LUMBAR FLEXION ROM	PRE A	2.51	0.883	0.614	Not Significant
	PRE B	2.214			
	POST A	5.428			
	POST B	5.285			
LUMBAR EXTENSION ROM	PRE A	1.428	0.002	0.020	Significant
	PRE B	1.714			
	POST A	3			
	POST B	3.428			
OSWESTRY DISABILITY INDEX	PRE A	44.428	0.855	0.401	Not Significant
	PRE B	41.571			
	POST A	17.142			
	POST B	15.571			



Graph 1: Graphical representation on comparison of maitland spinal mobilization technique and mckenzie exercise results



Figure 1: Maitland Spinal Mobilization (Group A).

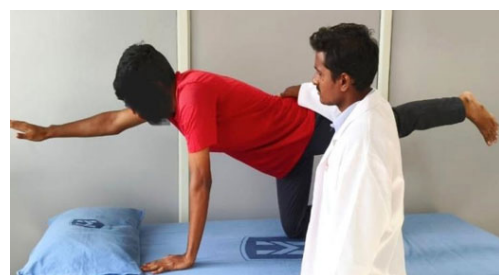


Figure 3: Core Stability Exercises (combined exercise).



Figure 2: McKenzie Exercise (Group B).